Debris Flow SR-2 Radar Operator Instructions

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Santiago Burn Area – El Toro Base

This assumes a single person SMART-R operation. See also the procedures outlined in the *Driver* and *Archival* instruction sheets.

LEVEL THE TRUCK

1) Turn on the power generator by turning the key in the generator cabinet to the right, much like an automobile ignition switch.
2) Push the two breakers in the generator compartment into the "on" (up) position.
3) Open the air compressor compartment and turn the thumbwheel screw to the right (screw direction is reversed from normal) for a minute or so to allow some air to blow out to remove any moisture from the compressor lines. When moisture stops dripping from the exhaust, close the thumbwheel screw.
4) Turn the upper power breakers in cab (behind the seat) to the "on" position. Breakers should point toward each other. *Don't touch the lower breakers*.
5) Turn on UPS to activate power to computers. Button in on the right rack near the bottom. It's the bigger button on the top of the two buttons. The radar computer will begin to boot. It takes ~5 minutes for the boot process to complete.
6) Turn on the Nav computer by pressing the leftmost rocker switch to the right in the panel directly below the LCD monitor in the aft cab rack.
7) Log on to the Nav computer using the wireless keyboard to Windows 2000: *User Name*: Administrator *Password*: smartr. NOTE: MAKE SURE THE "NUM LOCK" KEY IS NOT ENGAGED!!! (it has a tendency to come up engaged sometimes).
8) Activate the "*leveler*" program on the Nav computer.
9) With truck engine idle, turn on the PTO and Panel power switches located on the hydraulic control panel. Extend outwards the rear outriggers and lower all four leveling feet to within a few inches of the ground.
10) Place the metal plates beneath each leveler feet.
11) Raise and lower the various leveling feet to get the truck as level as possible using the leveler GUI.
12) Use the handheld GPS unit to find the truck's lat and lon. Walk from directly behind the truck ~50 feet to the back of the truck to find the truck's heading.

Computer Startup

These instructions assume the radar operator has been extensively trained in the use of the *SIGMET* software and the radar data archival procedures. Further, the radar operator must be very

familiar with the location of all subsystem power switches and breakers, and must be previously trained in the use of the transmitter control interface unit and the antenna control interface unit. Familiarity with the Linux operating system is also helpful.

1) **After confirmation that the antenna pedestal system is unstowed and ready**: Turn on the pedestal control interface power and reset the pedestal emergency shutdown switch.
2) Switch pedestal control to local mode.
3) Turn on the transmitter.
4) Login to SIGMET computer as "operator"
5) Password is: xxxxxx (6 lower-case x's)
6) Right click in an open area and select "New Window". If for some reason the X window system didn't start, type "**startx**" first, then "New Window".
7) Check to insure that the time is correctly set to UTC ($date –u). If not, use the handheld GPS to find the correct UTC time (mm is month, dd is day, hh is hour, nn is min) then::

```
Log in as superuser: $su
Password is xxxxxxxx (8 lower case x's)
$date -u mmddhhnn2006
$setclock
$exit
```

8) Scrub the data and ingest directories of previous data (insure that the old data has been backed up to CD-Rom first):

```
$cd /usr/iris_data/ingest
$rm *.*
$cd /usr/iris_data/product_raw
$rm *.*
```

9) If the truck heading angle has changed enter the new heading by typing in the terminal window: **`$antcheck -chat`**
10) Hit the ESC key, hit the Return key.
11) The prompt should change to: `RCP >`
12) Enter the azimuth axis mode: `RCP >axis az`
13) Scroll down to: Input offset from actual.
14) Enter the input offset angle as follows:

15) If heading angle:

> *h < 180.0 : Input offset angle = -h*
> *h > 180.0: Input offset angle = 180 - h*
> *h = 180.0 : Input offset angle = h*

16) Scroll out of axis az section by C/R

17) Enter Site custom mode: `RCP > site custom`

18) Scroll to: Sector 1 lower azimuth angle
Lower Azimuth Angle = h - 17.0

19) Enter lower azimuth angle and confirm (Two carriage returns)

20) Scroll to: Sector 1 upper azimuth angle
Upper azimuth angle = h + 17.0

21) Enter upper azimuth angle and confirm (Two carriage returns)

22) Issue the following commands to quit and reset the RCP interface:

23) Lower Elevation angle: **`quit`**
RCP > **`reset`**
RCP > **`Ctrl C`** (hold down Ctrl key and hit c)

24) Prompt changes back to Linux: `$`

25) Quit the antenna process:

I. **$qant**

26) If the truck location has changed enter the site specific info:

> $**setup**
> click on "RCP button in the window that appears
> enter the lat, long, & alt from the handheld GPS unit
> "*Save*" from the File menu
> "*Exit*" from the File menu

27) Start "Big Iris": **`$siris`**

28) Minimize the two very large windows that appear (upper right dot button)

29) Start and background "Little Iris" after "Big Iris" initiates: **`$iris &`**

DATA ACQUISITION

1) From the iris menu "*Menus*" click on "*Radar Status*". Verify that the TASK Sched is "**HMT**", the Product Sched is "**HMT**" and the Output Sched is "**DEFAULT**".

2) File menu: "*Close*"

3) Bring up the Task Scheduler: Menus: "*TASK Scheduler*".

4) Right click on ID:2 HMT VCP12 line at the word "Idle" and select "GO (ASAP)". The antenna should start scanning.

5) Bring up the real-time display from the iris menu "*Menus: Real Time Display*". It's the bottom item in the list. You should see the sweep line going around and the reflectivity echoes (if any) on the display. Note that the HMT VCP12 config has ground clutter surpression turned on, so don't be surprised not to see any ground return.

6) After a volume scan or two completes, verify that the products are being written to disk by bringing the LINUX window to the front and typing:

```
$cd /usr/iris_data/product_raw
$ll
The directory list should grow with each completed volume
scan. The date/time is encoded in the file name, (e.g.,
SR2080114173000, which is SR2yymmddhhnnss)
```

SHUTDOWN

1) Idle all TASKS in the "*TASK SCHEDULER"* MENU by issuing a "*STOP WHEN DONE"* to each task. Once all tasks in the task scheduler are idle, close the TASK SCHEDULER and STOP THE RADAR PROCESS from the RADAR STATUS MENU. Exit the rea1time Display, if up, and EXIT Iris.

2) At the Linux prompt in the terminal window: **`$qiris`**

3) When prompted: `Proceed with stopping? YES`

4) At the Linux prompt **`$antenna &`** (background the antenna process)

5) Using the antenna GUI, position the antenna at the rough stow position: Move the azimuth to point the antenna roughly directly off the back of the truck (h-180). Move the elevation to ~54.0 degrees.

6) Exit the antenna GUI.

7) At the Linux prompt: **`$qant`**

8) Switch the pedestal control to REMOTE on the pedestal control interface.

9) Actuate the EMERGENCY PEDESTAL SHUTDOWN switch.

10) Turn the transmitter OFF from the transmitter control panel.

11) Stow the antenna pedestal as previously trained. Make sure the antenna pedestal is left in the REMOTE CONTROL mode. (Top switch UP)

12) After the antenna pedestal has been stowed, return to the cab and turn the pedestal control interface unit OFF.

13) After completion of all data archival tasks:

`$shutdown -h now`

14) A confirmation window will pop, up asking for operator password. Issue the password and begin shutdown of the radar command and control processor.

15) After all data are archived to the Nav computer, shutdown WINDOWS 2000 from the icon on the bottom left of the screen.

16) After the radar command and control processor has indicated that it is safe to power down, turn OFF the UPS.

17) Turn the breakers behind the cab seat to the OFF position. Breakers should point away from each other

18) Turn the breakers in the generator cabnet to the OFF position (down). Turn off the generator.

19) Lock up the cab and generator compartment.

Mac Laptop Instructions

The Mac laptop is used to generate base-scan images and transmit them to the web server in Norman.

1) Power up the laptop by opening the lid and pushing the silver button on the right side
2) Log on to user "davej" with the password "**nssl**"
3) Start the X-window terminal application by clicking on the icon with the "X" in the dock at the bottom of the screen.
4) After the SIGMET computer has booted mount its raw data disc remotely by typing the command $**mountRAW**
5) Check to see if the mount was successful by typing $**dir product_raw**. When a volume scan completes a new raw data file should appear in that directory.
6) Start the script that arvhives new raw product files from ~/product_raw by typing **$raw2mac.** New raw files should now be archived in ~/Data/archive
7) Start the script that creates the base scan imagery by typing **$sigmet_imgs** Move the "map1" window to the far left side of the screen. Once data starts plotting be careful not to obscure the plot since the program will dump the screen to create the image. Image files should be located in $HOME/imgs.
8) Open a new terminal window by pulling down the menu "Applications/Terminal" and move it clear of the map1 window. In this window start the process that transfers images from the mac to *smartr.metr.ou.edu,* a machine that hosts the web site for image viewing:

   $ssh-agent /bin/bash
   $ssh-add ~/.ssh/id_dsa
   $wdssiif_to_www

   Log into smartr: **$ssh hmt@smartr.metr.ou.edu** (password: **n2l,rulZ**)
   Run: **$update_loops.sh**

   Loops should appear in URL:

   "http://smartr.metr.ou.edu/~hmt"http://smartr.metr.ou.edu/~hmt

SR2 - Data Archival Process to the NAV Computer

If the raw files are archived in real time using the raw2mac script on the laptop then you don't have to archive the files again to the NAV computer with these instructions.

These instructions assume the navigator has a working knowledge of both Microsoft Windows 2000 and RedHat Linux operating systems. Further, the operator should be familiar with transferring data files over an internet connection using FTP.

1) Create a new folder to contain data for the first CD of the current day's data on drive c: of the Navigator's computer, for example.
   `C:\HMT\081201`
   `SR2_081201A denotes the first CD for SR2, Dec 1, 2008`

2) Use the desktop FTP shortcut on the Navigator's computer to open an FTP session on the SMART-Radar Linux computer.
   At the prompt:

```
ftp > open 192.168.76.33)
Username > operator
Password > xxxxxx  (6 lower case x' s)
```

3) Define the incoming directory on the Windows machine.

```
ftp > lcd c:\SRI_081201A
```

4) Move to the Linux directory that contains the raw data.

```
ftp > cd /usr/iris_data/product_raw
```

5) Switch to binary file transfer mode.

```
ftp > bin
```

6) Turn off prompt mode.

```
ftp > prompt
```

7) Use wildcard character extensions, etc. to send the files from the Linux box to the Windows box. For example:

```
ftp > mget SR20812011712* (sends all files in hour 12 of
081201)
```

8) Quit the session when file transfer is complete.

```
ftp > quit
```

9) Load an unwritten CDROM disk into the Navigator's computer and use the CD burner software on the Navigator's machine to write the new data to CDROM. Label the disk when finished.

Quick dbz to rainfall rate (mm/hr) conversion using $Z=300R^{1.4}$ and $Z=200R^{1.6}$

dBZ	$Z=300R^{1.4}$ mm/hr	$Z=300R^{1.4}$ in/hr	$Z=200R^{1.60}$ mm/hr	$Z=200R^{1.60}$ in/hr
10.0	0.1	0.00	0.2	0.01
15.0	0.2	0.01	0.3	0.01
20.0	0.5	0.02	0.6	0.03
21.0	0.5	0.02	0.7	0.03
22.0	0.6	0.02	0.9	0.03
23.0	0.7	0.03	1.0	0.04
24.0	0.9	0.03	1.2	0.05
25.0	1.0	0.04	1.3	0.05
26.0	1.2	0.05	1.5	0.06
27.0	1.4	0.06	1.8	0.07
28.0	1.7	0.07	2.1	0.08
29.0	2.0	0.08	2.4	0.09
30.0	2.4	0.09	2.7	0.11
31.0	2.8	0.11	3.2	0.12
32.0	3.3	0.13	3.6	0.14
33.0	3.9	0.15	4.2	0.17
34.0	4.6	0.18	4.9	0.19
35.0	5.4	0.21	5.6	0.22
36.0	6.3	0.25	6.5	0.26
37.0	7.5	0.29	7.5	0.29
38.0	8.8	0.35	8.6	0.34
39.0	10.4	0.41	10.0	0.39
40.0	12.2	0.48	11.5	0.45
41.0	14.4	0.57	13.3	0.52
42.0	17.0	0.67	15.4	0.61
43.0	20.0	0.79	17.8	0.70
44.0	23.6	0.93	20.5	0.81
45.0	27.9	1.10	23.7	0.93
46.0	32.8	1.29	27.3	1.08
47.0	38.7	1.52	31.6	1.24
48.0	45.6	1.80	36.5	1.44
49.0	53.8	2.12	42.1	1.66
50.0	63.4	2.50	48.6	1.91
51.0	74.7	2.94	56.2	2.21
52.0	88.1	3.47	64.8	2.55
53.0	103.8	4.09	74.9	2.95
54.0	122.4	4.82	86.5	3.40
55.0	144.3	5.68	99.9	3.93
56.0	170.1	6.70	115.3	4.54
57.0	200.5	7.89	133.2	5.24
58.0	236.3	9.30	153.8	6.05
59.0	278.6	10.97	177.6	6.99
60.0	328.4	12.93	205.0	8.07

HMT Task Configuration Set Up

These are the radar task configuration set up parameters. Right click on the "***HMT-VCP12***" task and select "Edit" to bring up the task config editor.

14 Elevation Steps that mimic the VCP-12 volume scan, with a vertical incidence (90° elevation angle) added: 0.5°, 0.9°, 1.3°, 1.8°, 2.4°, 3.1°, 4.0°, 5.1°, 6.4°, 8.0°, 10.0°, 12.5°, 15.6°, 19.5°

Scan Speed: 22.0 deg/s

Data: Z T V W SQI

Samples: 64

Filter Dop: 3 (gets rid of ground clutter by a notch V_r filter around 0 m/s).

Bin Spacing: 125 m

Bin Average: 0

Max Range: 111.0 km

Input, Output bins: 889

High, Low PRF: 1350

Processing: FFT

Vel Unfold: OFF, No Data Corrections

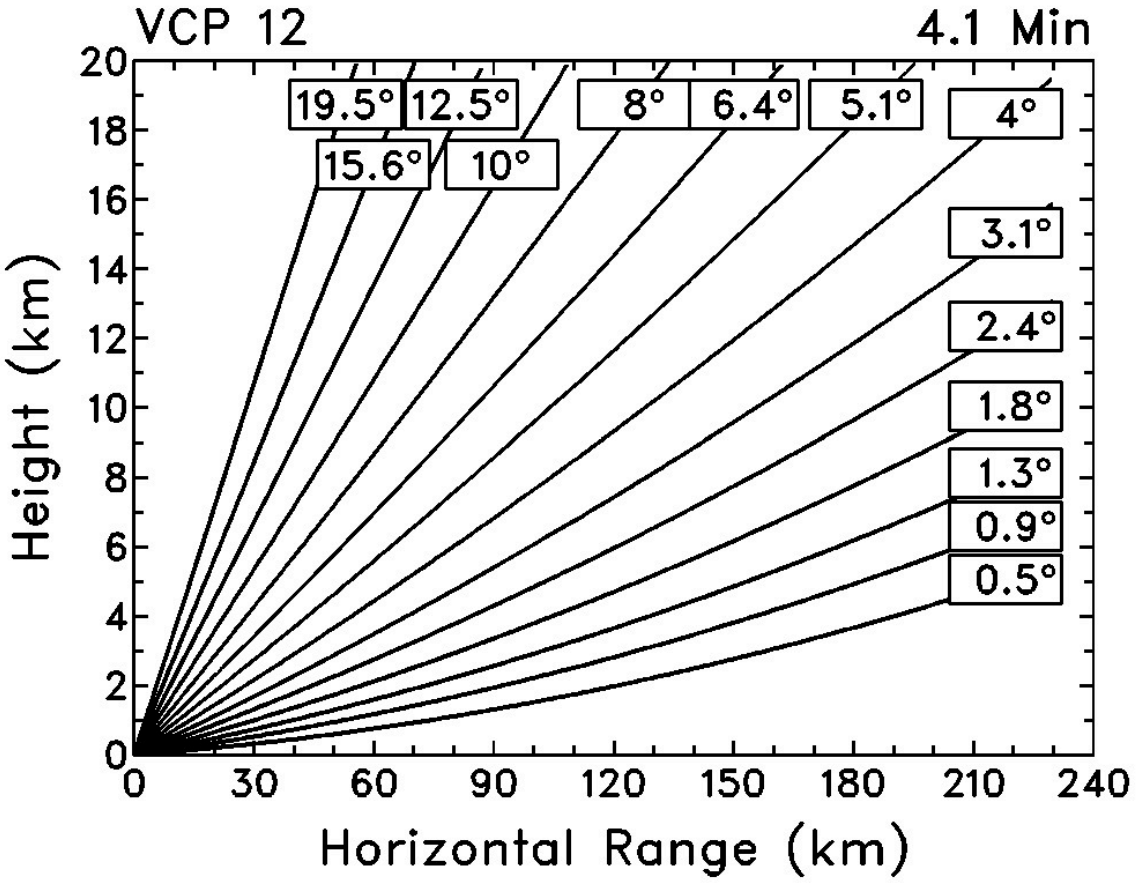
Data Quality Thresholds:

T	Log	Log 1.4
Z	Log + CSR	Sig 5
V	SQI+CSR	CSR 18
W	SIG+SQI+LOG	SQI 0.4

Speckle ON for Z & V

The HMT-VCP12 task should take ~4 min 43 seconds to complete. The repeat time is set for 5 minutes.

VCP-12 Elevation Angle Steps



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